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**METHOD AND APPARATUS FOR PRINTING [OF A] ON SUBSTRATES  
FOR PREPARING [OF] PACKAGING BLANKS**

FIELD OF THE INVENTION

The invention relates to a method and [an] apparatus for printing on a  
10 substrate for preparing packaging blanks.[, the] The substrate [being] is divided into  
copies, each of these copies having one or more areas for [the later] application of an  
adhesive, and a printed image [being] which is produced on the copy by [the]  
application of an ink film and [this printed image being] coated with a lacquer.

15 BACKGROUND OF THE INVENTION

For lacquering surfaces of substrates in the packaging industry, it is  
customary to use printing plates[, copied] made for this purpose[,] as lacquering  
plates. These lacquering plates are provided with partial recesses[,] in order to keep  
20 [the] adhesive flaps of [the] packaging blanks free of lacquer. This procedure was  
introduced in the book[,] entitled "Offsetdrucktechnik" (Offset Printing Technology)  
by Helmut Teschner, 9<sup>th</sup> Edition, 1995, pages 11 - 43. It is a disadvantage [here] that  
special lacquer plates are required, which are expensive to manufacture.

25 SUMMARY OF THE INVENTION

It is an object of the present invention to develop a method and [an]  
apparatus for printing on a substrate for preparing packaging blanks, for which  
specially manufactured lacquer plates are not required.

Pursuant to the present invention, this object[ive] is accomplished by the distinguishing features [of the 1<sup>st</sup>, 5<sup>th</sup>, 6<sup>th</sup> and 16<sup>th</sup> claim] as claimed.

5 The present invention has the advantage that a single lacquer plate can be used for several printing applications. This lacquer plate is free of partial recesses. As a result, the manufacturing costs can be reduced greatly. Since the lacquer plate can be used for several printing applications, the changeover times can also be shortened. Moreover, only one lacquering unit or lacquer tower is required.

## 10 BRIEF DESCRIPTION OF THE DRAWINGS

The invention is described in greater details by means of examples[. In the associated] with reference to the following drawings:

15 Figure 1 shows a diagrammatic representation of a sheet-fed offset printing press with three printing units; and

Figure 2 shows a diagrammatic representation of a sheet-fed offset printing press with five printing units.

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## DETAILED DESCRIPTION OF THE INVENTION

### Example 1

25 As can be seen from Figure 1, this sheet-fed printing press [consists of] comprises printing units 31, 32, 13, which are disposed in series. In [the] Figure 1, three printing units 31, 32, 13 are shown [by way of] as an example. The [inventive] method of the [example] present invention can also be carried out with only two printing units.

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A feeding apparatus 1 precedes the printing units 31, 32, 13. The construction and function of the feeding unit 1 are known so that it is unnecessary to go into detail[s here] herein. Each of the printing units 31, 32, 13 [consists of] comprises a back-pressure roll 21, 22, 25, a plate cylinder 5 and a rubber-covered cylinder 6. In Figure 1, the [(the] plate cylinder 5 and the rubber covered cylinder 6 are labeled only [in the Figure] in the printing unit 31[)]. The direction in which [the] sheets move is indicated by an arrow. Furthermore, [the] each of sheet-guiding cylinders 71, 72[, each of which] is [enclosed by] in contact with two of the back-pressure [cylinders] rolls 21, 22, 25 and [which] may [also] be constructed as a turning drum and [can be] used in face printing and perfecting printing[, can be recognized]. The back-pressure rolls 21, 22, 25 and the sheet-guiding cylinders 71, 72 are sheet-guiding cylinders with twice the diameter. [The tinting] Tinting units and damping units[,] belonging to each printing unit 31, 32[, are not shown [here] in Figure 1. A dryer 111 may be assigned to the printing unit 31.

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The printing units 31, 32[, shown here,] are intended for printing an ink system[,] which contains printing inks with radiation-drying, usually UV-drying components. It is, however, also possible to use the printing units for printing other inks. These printing inks may be, for example, [be] printing inks[, which are] typical for offset printing.

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The printing unit 13, which is intended for coating the surfaces of the [copy, which are] copies intended for [the] application of an adhesive, is disposed after the printing unit 32.

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In the direction in which the sheets are moving, [the] a lacquer tower 4[, which is used] for coating the printed image with a layer of lacquer[,] is disposed after the printing unit 13. This layer of lacquer [here] can also be dried by radiation. The lacquer tower 4 [consists of the] comprises a back-pressure roll 26, to which a

lacquer plate cylinder 8 is assigned. A lacquer plate 81 is clamped on the lacquer plate cylinder 8. A sheet-guiding cylinder 75 precedes the back-pressure roll.

5 An engraved ink transfer cylinder roll 9 is assigned to the lacquer plate cylinder 8 or the lacquer plate 81. A chamber doctor blade 10 is [employed] used for supplying lacquer to [this] the engraved ink transfer [roller] cylinder roll 9. Furthermore, a dryer 112 is assigned to the lacquer tower 4.

10 A delivery end 12 is provided after the lacquer tower 4. The construction and function of the delivery end 12 are known so that they [do not have to be dealt with in greater] are not described in detail [here] herein.

The [following inventive] method of the present invention described below may be [is] realized with the apparatus shown in [described by means of]  
15 Figure 1.

[The printed] A sheet to be printed is fed to [, put in readiness with] the feeding apparatus 1[, is] and taken hold of by [devices] the apparatus, the details of which are not described [here] herein, and put [in] into motion [(] in the direction of  
20 the arrow[)]. In the printing units 31, 32, [the ink is applied with] a first ink[ing] system is applied over the rubber-covered cylinder 6. The ink[ing] system is understood to be a [complex] combination of inks, which [essentially] have essentially the same processing properties.

25 The ink[ing] system[, ] used in the printing units 31, 32[, ] may contain [portions of ink,] an ink which cures under radiation, [(in the] for example, under UV radiation[)]. Such inks are referred to as hybrid inks. It is, however, also possible to use inks [here,] which are typically used for offset printing, or [also] other inks, such as pure UV inks.

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Optionally, the inks can be dried by the dryer 111.

In the [inking] printing unit 13, [the ink of] a [further inking] second ink system is applied on the surfaces provided for [the] application of [the] an adhesive. This ink system contains only a [slight number] small amount of pigments[, if any] or substantially no pigments at all.

In the lacquer tower 4, the [whole] surface of the substrate is coated with a colorless lacquer. [For this purpose a] The lacquer [is] used[, which] for this purpose has the property of interacting differently with the ink systems applied. This takes place [owing] due to the fact that the lacquer is absorbed by the coating (the second ink system) of the surface[s] intended for [the] application of [the] an adhesive. However, [it] the lacquer remains largely on the other surface[, which has been provided] applied with inks of the first inking system, and endows [this] the surface [surface] with a gloss.

It is a prerequisite for the occurrences of the above effect that the two inking systems differ from one another with regard to [their] lacquer-absorption capability. The degree of gloss is inversely proportional to the [ability] capacity of the ink[ing] system to absorb lacquer, so that more lacquer [remaining] remains [at] on [the] surfaces of ink layers with ink[ing] systems of [a] lower absorptive [capacity] capacities, and [a higher proportion of the ink layer] more lacquer is [being] absorbed [in] by ink layers [from] with ink[ing] systems of [a] higher absorptive [capacity] capacities. The gloss-determining components of the lacquer [are] can be taken up by the ink [layer] layers. Thus, the [This] coating [then] forms a suitable substrate for [the later] subsequent application of [the] an adhesive.

Example 2

The construction of the sheet-fed printing press for realizing the method of example 2 corresponds largely to the configuration shown in Figure 1.

Instead of a second ink[ing] system, a binder customarily used in offset printing, usually a varnish, is printed by the printing unit 13.

When the lacquer is applied over the [whole] surface of the substrate in the lacquer tower 4, the effect [with regard to the] resulted from absorption of the lacquer by the [binder, which is] ink systems as described above[,] also occurs here when a binder is used.

### Example 3

As is evident from Figure 2, two printing units 31, 32[,] for printing a first ink system are disposed in this example. A dryer 111 may be assigned to the printing unit 32. Two additional printing units 33, 34[,] for printing [a further] an additional ink system and a printing unit 13 are disposed after the printing units 31, 32. As in the preceding examples, the series of printing units [is] also ends at [terminated here also by] a lacquer tower 4.

With this configuration, the following method is realized:

The printed image[,] desired for [the] a corresponding packaging[,] is applied by the printing units 31, [34] 32. In this connection, a layer of inks [ink, which consists of the] comprising inks of a first ink[ing] system[,] is applied in the [inking] printing units [unit] 31, 32. This layer may be composed of hybrid inks, [hybrid inks being] which is understood to be inks[, which contain portions of] comprising at least some [an] ink[,] which [is] can be cured by radiation (especially by UV radiation). These inks are dried in the printing unit 31 by a dryer 111, which is constructed as a UV radiator.

The printing units 33, 34 are used for printing an ink system, which [consists of] comprises inks typically [employed] used for offset printing. These inks do not have to be dried by an appropriate device.

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In the printing unit 13, a binder[, usually a varnish,] which is [customary] customarily used in offset printing, usually a varnish, is applied on the areas intended for [the] application of [the] an adhesive.

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Subsequently, the [whole] surface of the substrate is coated in the lacquer tower 8 with a closed layer of lacquer. The lacquer is absorbed by the coating of the areas intended for [the] application of [the] an adhesive. The other areas of the copy are coated with different ink[ing] systems by the [inking] printing units 31, 32, 33, 34. Due to [the] different lacquer absorptive [capacity] capacities of the ink systems, the lacquer is absorbed by these areas in different amounts. As a result,

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different degrees of gloss can be achieved.

### **[List of Reference Symbols Used**

|    |         |                                |
|----|---------|--------------------------------|
|    | 1       | feeding apparatus              |
|    | 21 - 26 | back pressure roll             |
| 5  | 31- 34  | printing unit                  |
|    | 4       | lacquer tower                  |
|    | 5       | plate cylinder]                |
|    | 6       | rubber-covered cylinder        |
|    | 71 – 75 | sheet-guiding cylinder         |
| 10 | 8       | lacquer plate cylinder         |
|    | 81      | lacquer plate                  |
|    | 9       | engraved ink transfer cylinder |
|    | 10      | chamber doctor blade           |
|    | 111-112 | dryer                          |
| 15 | 12      | delivery end                   |
|    | 13      | printing unit for varnish]     |



## ABSTRACT

The present invention relates to a method and [an] apparatus for printing on a substrate for preparing packaging blanks. The [, the] substrate [being] 5 are divided into copies, each of these copies having one or more areas for [the later] subsequent application of an adhesive, and a printed image [being] produced on the copy by [the] application of an ink film and [this printed image being] coated with a lacquer.

10 It is an object of the present invention to develop a method and [an] apparatus for printing on a substrate for preparing packaging blanks, for which specially manufactured lacquer plates are not required.

Pursuant to the present invention, this object[ive] is accomplished 15 [owing to] based on the fact that[, for producing a printed image,] an ink film and a binder[,] customarily used for offset printing inks[,] are [printed] used to produce a printed image on a substrate, [the binder being applied at areas intended for the application of an adhesive, the] and a lacquer [being] is applied over the whole surface of the substrate, [and a] wherein the binder is applied at areas intended for 20 application of an adhesive and the lacquer [being used, which] is absorbed by the binder.